

CLAIM AMENDMENTS

1. (Currently Amended)

An improved ~~A~~ multi-stage electric pump unit, having a multi-stage centrifugal pump with an electric motor coupled directly to the pump, where each stage has ~~a pump~~, an impeller and a diffuser, which each have channels with vaned and vaneless zones, each of these zones are delimited by a shroud-surface and a hub-surface, where angle β is the angle of the tangent at each point, ~~characterized in that~~ Y-axis of the electric pump is the radial co-ordinate and X-axis is the axial co-ordinate, the improvement comprising, for flow rates, Q , between 2500 and 8000 litres/minute, the points of the impeller and diffuser surface comply with the sixth degree polynomial equation, $Y = f(x) = Ax^6 + Bx^5 + Cx^4 + Dx^3 + Ex^2 + Fx + G$, where on the diffuser:

a) on the hub, the vaneless zone is defined by parameters selected from a set of $A=B=C=D=E=0$, $F=0.6605$, $G=20.45$, or a set of $A=0$, $B=0$, $C=-1E-05$, $D=0.0073$, $E=-1.7542$, $F=186.27$, $G=-7311.6$;

b) on the shroud, the vaneless zone is defined by

parameters selected from a set of $A=B=C=D=E=0$, $F=0.7225$,
 $G=55.648$, or a set of $A=0$, $B=0$, $C=0$, $D=0.0053$, $E=-2.6745$,
 $F=446.37$, $-G=24717$;

c) on the hub, the vaned zone is defined by a
parameter set : $A=-9E-09$; $B=7E-06$; $C=-0.0019$; $D=0.3064$;
 $E=-26.923$; $F=1256.3$; $G=-24283$;

d) on the shroud, the vaned zone is defined by a
parameter set: $A=1E-10$; $B=-9E-08$; $C=2E-05$; $D=-0.0033$;
 $E=0.2349$; $F=-7.616$; $G=174.28$;

~~e) on the hub, the vaneless zone; $A=0$; $B=0$; $C=1E-05$; $D=0.0073$; $E=-1.7542$; $F=186.27$; $G=-7311.6$;~~

~~f) on the shroud, the vaneless zone; $A=0$; $B=0$; $C=0$;
 $D=0.0053$; $E=-2.6745$; $F=446.37$; $-G=24717$;~~

~~g~~e) on the hub, β is defined by a parameter set:
 $A=0$; $B=0$; $C=1E-06$; $D=-0.0002$; $E=0.0203$; $F=-1.0819$;
 $G=156.82$; and

~~h~~f) on the shroud, β is defined by a parameter set:
 $A=0$; $B=0$; $C=3E-07$; $D=-1E-04$; $E=0.0101$; $F=-0.7587$; $G=175$.

2. (Currently Amended)

An improved A-multi-stage electric pump unit, of Claim 1, having a multi-stage centrifugal pump with an electric motor coupled directly to the pump, where each stage has an impeller and a diffuser, which each have channels with vaned and vaneless zones, each of these zones are delimited by a shroud-surface and a hub-surface, where angle β is the angle of the tangent at each point, Y-axis of the electric pump is the radial co-ordinate and X-axis is the axial co-ordinate, the improvement comprising, for flow rates Q , between 2500 and 6000 liters/minute, the points of the impeller and diffuser surface comply with the sixth degree polynomial equation, $Y = f(x) = Ax^6 + Bx^5 + Cx^4 + Dx^3 + Ex^2 + Fx + G$, where characterized because on the impeller:

a1) on the hub, the vaneless zone; is defined by a parameter set: $A=0; B=0; C=0; D=6E-05; E=0.0014; F=-0.0146; G=27.511;$

b1) on the shroud, the vaneless zone; is defined by a parameter set: $A=0; B=0; C=0; D=0; E=0; F=0; G=64.5;$

c1) on the hub, the vaned zone; is defined by a

parameter set: A=0; B=0; C=5E-06; D=-0.0014; E=0.1535; F=-6.3821; G=121.24;

d1) on the shroud, the vaned zone, is defined by a parameter set: A=-4E-08; B=8E-06; C=-0.0006; D=0.0247; E=-0.4771; F=4.3023; G=50.015;

e1) on the hub, β , is defined by a parameter set: A=0; B=3E-09; C=-9E-07; D=0.0001; E=-0.0042; F=-0.0915; G=34.402; and

f1) on the shroud, β , is defined by a parameter set: A=0; B=1E-09; C=-5E-07; D=6E-05; E=-0.0044; F=0.1822; G=22.2.

3. (Currently Amended)

An improved A multi-stage electric pump unit, of Claim 1, having a multi-stage centrifugal pump with an electric motor coupled directly to the pump, where each stage has an impeller and a diffuser, which each have channels with vaned and vaneless zones, each of these zones are delimited by a shroud-surface and a hub-surface, where angle β is the angle of the tangent at each point, Y-axis of the electric

pump is the radial co-ordinate and X-axis is the axial co-ordinate, the improvement comprising, for flow rates Q, between 4500 and 6000 liters/minute, the points of the impeller and diffuser surface comply with the sixth degree polynomial equation, $Y = f(x) = Ax^6 + Bx^5 + Cx^4 + Dx^3 + Ex^2 + Fx + G$, where characterized because on the impeller:

a2) on the hub, the vaneless zone is defined by a parameter set: A=0; B=0; C=0; D=5E-05; E=0.0013; F=-0.0139; G=27.511;

b2) on the shroud, the vaneless zone is defined by a parameter set: A=0; B=0; C=0; D=0; E=0; F=0; G=64.5;

c2) on the hub, the vaned zone is defined by a parameter set: A=0; B=0; C=5E-06; D=-0.0012; E=0.1205; F=-4.7599; G=93.614;

d2) on the shroud, the vaned zone is defined by a parameter set: A=0; B=7E-07; C=-0.0001; D=0.0058; E=-0.113; F=0.8709; G=62.273;

e2) on the hub, β is defined by a parameter set: A=0; B=0; C=9E-08; D=-3E-05; E=0.0002; F=0.0246; G=41.062;

and

f2) on the shroud B_+ is defined by a parameter set:

A=0; B=0; C=-6E-07; D=0.0001; E=-0.0126; F=0.5887;

G=23.694.